

Active Microwave Technologies Using Ultra-High efficiency P-Band and L -Band Power Amplifiers, Phase I

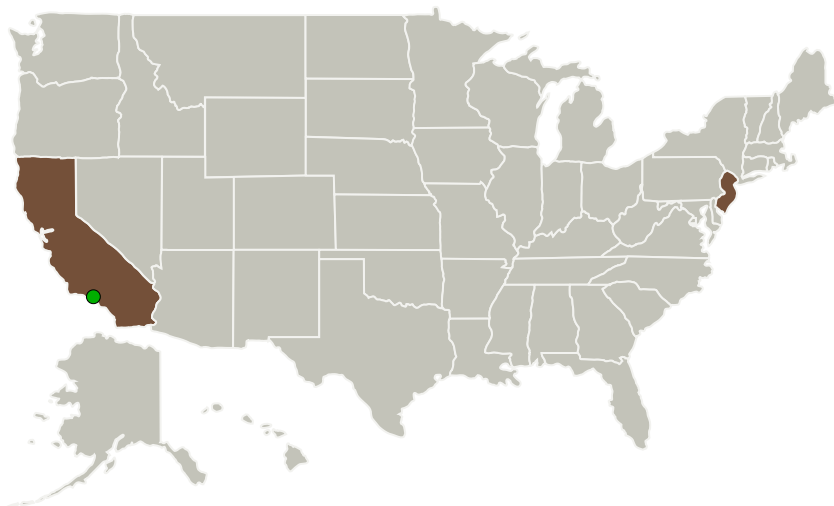
Completed Technology Project (2011 - 2011)



Project Introduction

AlGaIn/GaN devices on SiC substrates will be utilized to achieve Power Added Efficiencies (PAE) in excess of 85%. These wide band-gap solid-state semiconductors will be used in novel Power Amplifier (PA) topologies such as Current Mode Class D (CMCD) and Class E. The power output goal of a single P-band PA module is greater than 50W, and the power output goal of the L-band PA module is greater than 10W. In turn, these power modules will be combined in push-pull to balance configurations for higher power. Phase I will consist of choosing the devices sizes and topologies for the PA modules, and performing extensive modeling and simulation, especially for the large signal non-linear operation with harmonic terminations required to achieve the high efficiency goals. In addition, various power configurations will be simulated to achieve a 50 Ohm output without extensive impedance matching transformations to improve efficiency and useable bandwidth. The power sizing strategies will be evaluated for overall system efficiency, size, and weight trade-offs.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
MaXentric Technologies, LLC	Lead Organization	Industry	Fort Lee, New Jersey
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	New Jersey

Project Transitions

▶ **February 2011:** Project Start

✓ **September 2011:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137946>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

MaXentric Technologies, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

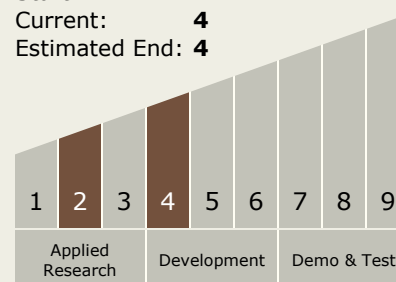
Carlos Torrez

Principal Investigator:

Donald F Kimball

Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.3 Power Management and Distribution
 - └ TX03.3.3 Electrical Power Conversion and Regulation

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System